DOCUMENT RESUME

ED 023 884 08 VT 006 887

By-Rahmlow, Harold F.; And Others

Occupational Mathematics; Ratios and Fractions. Report No. 16-D. Final Report.
Washington State Coordinating Council for Occupational Education, Olympia.; Washington State Univ., Pullman. Dept. of Education.
Spons Agency-Office of Education (DHEW), Washington, D.C.
Bureau No-BR-7-0031
Pub Date Jun 68
Grant-OEG-4-7-070031-1626
Note-76p.
EDRS Price MF-$0.50 HC-$3.90
Descriptors-*Fractions, *Programed Texts, *Ratios (Mathematics), *Vocational Education

This programed mathematics textbook is for student use in vocational education courses. It was developed as part of a programed series covering 21 mathematical competencies which were identified by university researchers through task analysis of several occupational clusters. The development of a sequential content structure was also based on these mathematics competencies. After completion of this program the student should be able to demonstrate (1) his recognition of fractions of the form a/b where a and b are letters or positive integers less than 100, (2) knowledge of the terms numerator and denominator, (3) how shaded areas of plane figures can be represented by fractions, (4) knowledge of the relationship between a ratio and a fraction, and (5) that competency has been attained by answering four out of five multiple choice test items covering each objective. The material is to be used by individual students under teacher supervision. Twenty-six other programed texts and an introductory volume are available as VT 006 882-VT 006 909, and VT 006 975. (EM)

FINAL REPORT
Project No. 0E7-0031
Contract No. OEG-4-7-070031-1626
Report No. 16-D

Occupational Mathematics

RATIOS AND FRACTIONS

ED023884

June 1968

U.S. DEPARTMENT OF
HEALTH, EDUCATION AND WELFARE

Office of Education
Bureau of Research

VT006887

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

Occupational Mathematics

RATIOS AND FRACTIONS

Project No. OE7-0031
Contract No. OEG-4-7-070031-1626
Report No. 16-D

by
Harold F. Rahmlow
Karl Ostheller
Clarence Potratz
Leonard T. Winchell
Arthur Snoey

June 1968

The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

Washington State University, Department of Education, Pullman, Washington
State Coordinating Council for occupational Education, Olympia, Washington

OBJECTIVES

1. The student should be able to demonstrate his recognition of fractions of the form a/b where a and b are letters or positive integers less than 100.

2. The student should be able to demonstrate his knowledge of the terms numerator and denominator.

3. The student should be able to demonstrate how shaded areas of plane figures can be represented by fractions.

4. The student should be able to demonstrate his knowledge of the relationship between a ratio and a fraction.

5. The student should be able to demonstrate that he has attained competency in the four previously mentioned objectives by correctly answering 4 out of 5 multiple-choice test items covering each objective.

Greetings! You are about to begin improving your knowledge of basic mathematics. There are many important uses for the mathematics you are learning.

This booklet is not like your ordinary books. It is designed to help you learn as an individual. On the following pages you will find some information about mathematics. After the information is presented, you will be asked a question. Your answers to these questions will determine how you proceed through this booklet. When you have selected your answer to the question, turn to the page you are told to.

Do not write in this booklet. You may wish to have a pencil and some paper handy so you can write when you want to.

Remember this is not an ordinary book.

1. Study the material on the page.

2. Read the question on the page (you may want to restudy the material on the page).

3. Select the answer you believe is correct.

4. Turn to the page indicated by your answer.

Are you ready to begin?

(a) Yes — Turn to page 1

(b) No — Turn to page C

(c) HELP — Go see your teacher

Your answer was (b) No.

Well, this booklet is a little different.

Go back and read page B again. After you have read it you will probably be ready to begin.

You are already familiar with numbers such as 1, 2, 3, 4 and 5. These numbers are called integers. But integers alone are not enough to solve all problems. The ability to use fractions is also very important. Quantities like 2/5 and 1/3 are fractions.

Which of these is a fraction?

(a) 16 Turn to page 2

(b) 1/2 Turn to page 11

(c) 3.6 Turn to page 2

Your answer was either 16 or 3.6. No! The correct answer was 1/2.

A fraction is a quantity of the form a/b. You read this as "a divided by b." Both a and b must be integers. (You recall that an integer is any whole number like 1, 10, 20 or 55.) The letter a can represent any integer. The letter b can represent any integer except zero.

For example, 1/2, 3/4, 21/23, and 7/5 are all fractions.

Here's one for you to try.

Which of the following is a fraction?

(a)	10.7	Turn to page 7
(b)	7/10	Turn to page 12
(c)	Neither of the above	Turn to page 7

Very good! x = 4 and y = 7 is correct.

Here's one more.

If a = 3 and b = 5, then a/b = ?

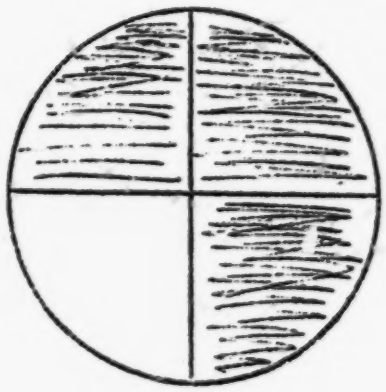
(a) 5/3 Turn to page 8

(b) 3/5 Turn to page 4

(c) I'm not sure how to do it Turn to page 9

Your answer was 3/5. Good! You're getting it. Let's go on.

One important use of fractions is illustrated by the following question.



Look at the drawing on the left. What fraction of the circle is darkened?

(a) 2/3 Turn to page 25

(b) 3/4 Turn to page 16

(c) 4/3 Turn to page 15

(d) 1/4 Turn to page 24

Your last answer was incorrect. The correct answer was 3/5. It is very important to substitute correctly. Be careful not to switch the a and b around. The numbers must be put in <u>exactly</u> the same place as the letters which represented them.

Now let's try again.

If a fraction 4/7 is represented by x/y, then

(a)	x = 4 and y = 7	Turn to page 3
(b)	y = 4 and x = 7	Turn to page 8
(c)	Not enough information given	Turn to page 9
(d)	Don't know	Turn to page 10

Your answer was 5. Good! Now, you're getting it.

Remember that a fraction is always in the form a/b, where a and b are integers.

If a = 3 and b = 5, what numerical fraction is a/b?

(a) 5/3 Turn to page 5

(b) 3/5 Turn to page 4

(c) Both of the above Turn to page 5

(d) I don't understand the question Turn to page 13

Your last answer was 10.7 or neither. The correct answer was 7/10. You still do not have the idea of a fraction clear in your mind. A fraction must be of the form a/b. Decimals are not of this form. 1/3, 1/4, 8/5 and 13/11 are all fractions.

Remember that a/b is the general form of any fraction.

In the fraction 1/3, a = 1 and b = 3.

In the fraction 13/11, a = 13 and b = 11.

Now you do one.

In the fraction 8/5, a = 8 and b = ?

(a) 8	Turn to page 14
(b) 5	Turn to page 6
(c) I don't understand what to do	Turn to page 14

Your last answer was incorrect. You seem to be having difficulty understanding the relationship of numbers and letters.

Go to the unit on substituting numbers and letters. Then come back to page 1 of this unit.

Your last answer was incorrect. You seem to be having difficulty understanding the relationship of numbers and letters.

Go to the unit on substituting numbers and letters. Then come back to page 1 of this unit.

Your last answer was incorrect. You seem to be having difficulty understanding the relationship of numbers and letters.

Go to the unit on substituting numbers and letters. Then come back to page 1 of this unit.

Your answer was 1/2. Very good!

You recognized the fraction. Recall that we always need two integers a and b to form a fraction. They are always in the form a/b. We read this as "a divided by b." Remember that b cannot be zero. You must never divide by zero.

If a/b is a fraction and a = 3 and b = 5, what numerical fraction is represented by a/b?

(a) 5/3 Turn to page 5

(b) 3/5 Turn to page 4

(c) I don't understand the question. Turn to page 13

Your answer was 7/10. Good! Now, you're getting it.

Remember that a fraction is always in the form a/b, where a and b are integers.

If a = 3 and b = 5, what numerical fraction is a/b?

(a) 5/3 Turn to page 5

(b) 3/5 Turn to page 4

(c) Both of the above Turn to page 5

(d) I don't understand the question Turn to page 13

You said you did not understand the last question.

The idea of substituting numbers for letters must be understood before going on.

Go take the unit on substitution. Then return to page 1 of this unit.

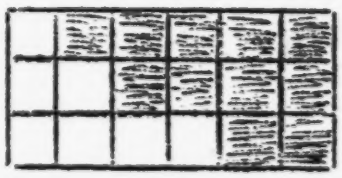
The correct answer on the last question should have been 5. You are having difficulty with the idea of a fraction.

Go see your teacher for help. Then come back to the beginning of this unit.

Your answer was 4/3. The correct answer was 3/4.

Turn to page 21.

Good! Your answer was 3/4. That is correct. Here is another one like the last.



What fraction of the rectangle on the left is shaded?

(a) 1/2 Turn to page 32

(b) 11/18 Turn to page 19

(c) 7/18 Turn to page 30

(d) I don't understand how to tell Turn to page 30

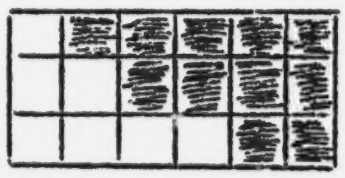
You seem to be having difficulty in this area.

Go tell your teacher you are having trouble with the section on shaded figures. Perhaps she can help you to understand.

Then, return to page 4.

Good! Your answer was 5/7. Now you're getting it.

Here is another one like the last.



What fraction of the rectangle on the left is shaded?

(a) 1/2 Turn to page 32

(b) 11/18 Turn to page 19

(c) 7/18 Turn to page 30

(d) I don't understand how to tell. Turn to page 30

Good! Your answer was 11/18. That is correct. Now, you understand how a simple diagram can represent a fraction.

You remember that a fraction is expressed in the form a/b, where a and b are integers. It is often important to talk about a or b separately.

In any fraction a/b read "a divided by b," a is called the numerator. b is called the denominator. You should become familiar with these terms. The top number is always the numerator. The bottom number is always the denominator.

In the fraction 3/4, 3 is the

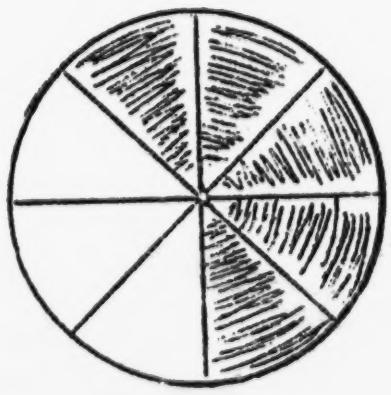
(a) denominator Turn to page 39

(b) numerator Turn to page 45

(c) Don't know Turn to page 39

Your answer was 7/18. Very good! Now, you're catching on.

Maybe you'd better do one more just to be sure.



What fraction of the circle on the left is shaded?

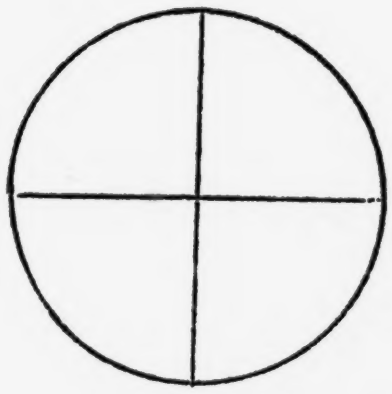
(a) 5/9 Turn to page 31

(b) 8/5 Turn to page 36

(c) 3/4 Turn to page 36

(d) 5/8 Turn to page 29

Let's see what is happening in this problem.

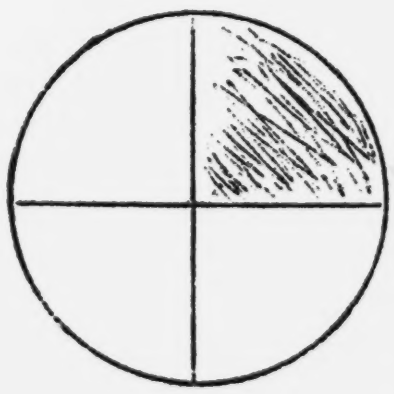


Look at the drawing.

You will notice that the circle is divided into fourths. This means that there are four parts in the whole circle. Also, every part is the same size.

In the circle below you can see that one of the four parts has been darkened. This is the same as saying that 1/4 is the fraction of the circle that has been darkened.

By now you should be familiar with the general form of a fraction a/b, where a and b are integers.



The b in the fraction tells how many equal parts we cut the circle. The a tells how many of these we are talking about.

(Continued on next page)

Let's look at one more.

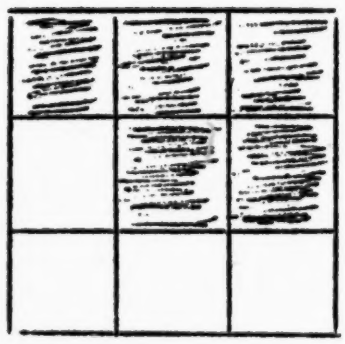
What fraction of the rectangle on the left is darkened?

You can see that the rectangle is divided into 3 equal parts. So, b = 3. Also, 2 of these are darkened, so a = 2.

Knowing these two things, a = 2 and b = 3, we say that 2/3 of the rectangle is darkened.

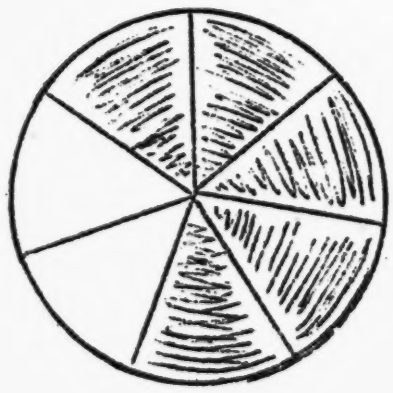
(Continued on next page)

Here is another one.



The square on the left is divided into nine equal parts. Five of these nine parts are shaded. We can then say that the shaded part is 5/9 of the square.

Now you try one.



In the drawing, what fraction of the circle is shaded?

(a) 2/7 Turn to page 34

(b) 3/4 Turn to page 35

(c) 5/7 Turn to page 18

(d) 7/5 Turn to page 35

Your answer was 1/4. The correct answer was 3/4.

Turn to page 21.

Your answer was 2/3. The correct answer was 3/4.

Turn to page 21.

Good! Your answer was 5/12. That is correct. Now, you understand how a simple diagram can represent a fraction.

You remember that a fraction is expressed in the form a/b, where a and b are integers. It is often important to talk about a or b separately.

In any fraction a/b read "a divided by b," a is called the <u>numerator</u>. b is called the <u>denominator</u>. You should become familiar with these terms. The top number is always the numerator. The bottom number is always the denominator.

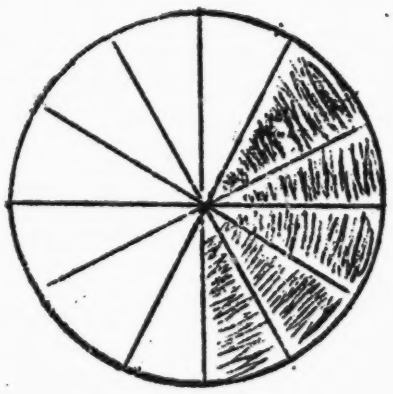
In the fraction 3/4, 3 is the

(a) denominator Turn to page 39

(b) numerator Turn to page 45

(c) Don't know Turn to page 39

Fine! Your last answer of 5/9 was correct. I think maybe you've got it now.



What fraction of the circle on the left is shaded?

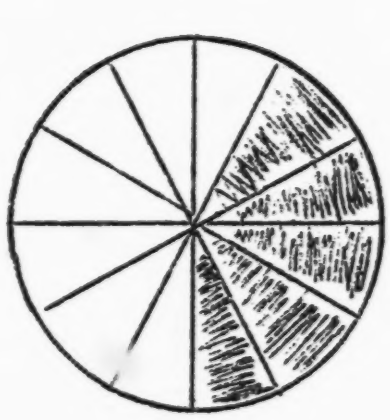
(a) 1/3 Turn to page 33

(b) 7/12 Turn to page 17

(c) 5/12 Turn to page 26

(d) I still don't see it Turn to page 17

Fine! Your last answer of 5/8 was correct. I think you've got it now.



What fraction of the circle on the left is shaded?

(a) 1/3 Turn to page 33

(b) 7/12 Turn to page 17

(c) 5/12 Turn to page 26

(d) I still don't see it Turn to page 17

Good! Your answer was 5/8. That is correct. Now you understand how a simple diagram can represent a fraction.

You remember that a fraction is expressed in the form a/b, where a and b are integers. It is often important to talk about a or b separately.

In any fraction a/b read "a divided by b," a is called the <u>numerator</u>. b is called the <u>denominator</u>. You should become familiar with these terms. The top number is always the numerator. The bottom number is always the denominator.

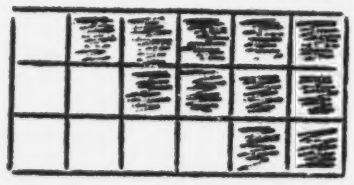
In the fraction 3/4, 3 is the

(a) denominator Turn to page 39

(b) numerator Turn to page 45

(c) Don't know Turn to page 39

Your last answer was 7/18 or you didn't understand. The correct answer was 11/18. Let's see the correct way to do it.

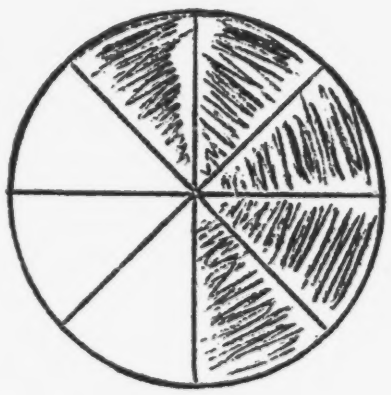


Count the total number of equal parts inside the rectangle. There are 18. So, the denominator of our fraction is 18.

How many of those 18 are shaded? Count them. You should have counted 11. So, 11 is the numerator.

Then, we say that 11/18 of the rectangle is shaded.

Here's another one for you to do.



What fraction of the circle on the left is shaded?

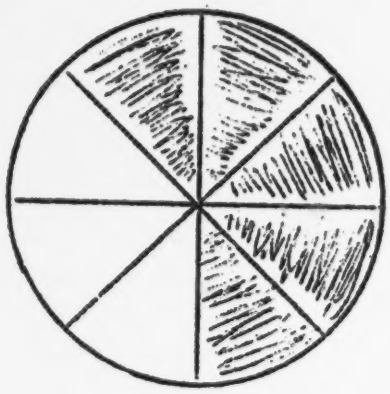
(a) 5/9 Turn to page 31

(b) 8/5 Turn to page 36

(c) 3/4 Turn to page 36

(d) 5/8 Turn to page 28

Your last answer was 5/9. No! The correct answer was 5/8.

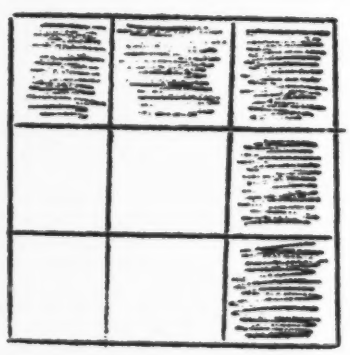


Let's look at it again. Remember that the denominator always tells how many equal parts there are in the total. In this problem there should be 8. Count them.

How many of the total parts are shaded? There are 5 parts shaded.

Then, we simply say that 5/8 of the entire circle is shaded.

Did that help you any? Here's another one.



What fraction of the square on the left is shaded?

(a) 5/9 Turn to page 27

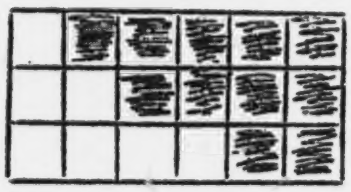
(b) 4/9 Turn to page 33

(c) 1/2 Turn to page 17

(d) I just don't get it Turn to page 33

Your last answer was 1/2. The correct answer was 11/18.

Let's see the correct way to do it.

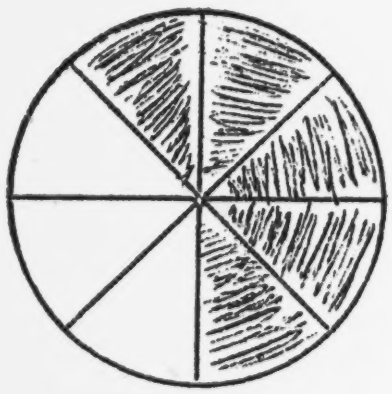


Count the total number of equal parts inside the rectangle. There are 18. So, the denominator of our fraction is 18.

How many of those 18 are shaded? Count them. You should have counted 11. So, 11 is the numerator.

Then, we say that 11/18 of the rectangle is shaded.

Here's another one for you to do.



What fraction of the circle on the left is shaded?

(a) 5/9 Turn to page 31

(b) 8/5 Turn to page 36

(c) 3/4 Turn to page 36

(d) 5/8 Turn to page 28

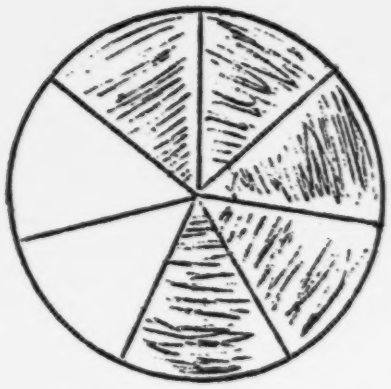
You seem to be having difficulty in this area.

Go tell your teacher you are having trouble with the section on shaded figures. Perhaps she can help you to understand.

Then, return to page 4.

Your answer was 2/7. The correct answer was 5/7.

Let's see why 5/7 is the right answer.

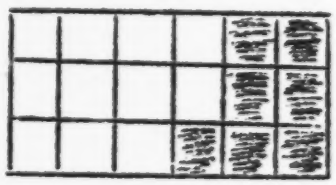


Count the number of parts in the circle. You should have counted 7 parts. Now, count the number of shaded parts. You should have counted 5 shaded parts.

There are 7 equal parts, and 5 of them are shaded. Then, we say 5/7 of the circle is shaded.

It's really not so hard, is it?

Here is one more.



What fraction of the rectangle on the left is shaded?

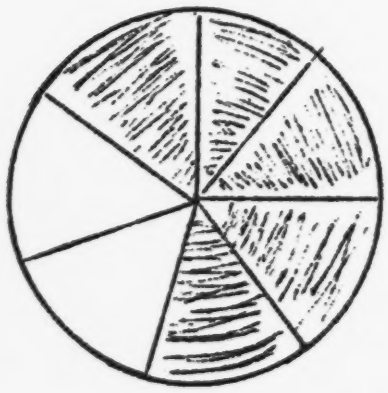
(a) 1/3 Turn to page 17

(b) 11/18 Turn to page 33

(c) 7/18 Turn to page 20

(d) I don't understand how to tell Turn to page 33

Your answer was 3/4 or 7/5. The correct answer was 5/7. Let's see why 5/7 is the right answer.

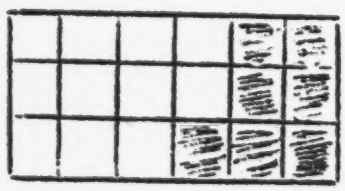


Count the number of parts in the circle. You should have counted 7 parts. Now, count the number of shaded parts. You should have counted 5 shaded parts.

There are 7 equal parts, and 5 of them are shaded. Then, we say 5/7 of the circle is shaded.

It's really not so hard, is it?

Here is one more.



What fraction of the rectangle on the left is shaded?

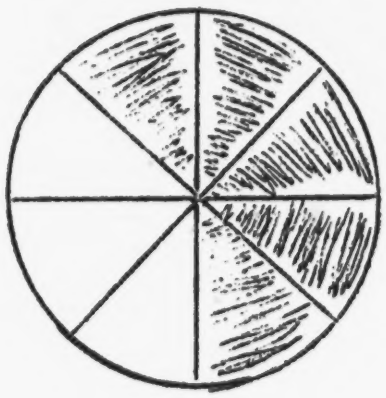
(a) 1/3 Turn to page 17

(b) 11/18 Turn to page 33

(c) 7/18 Turn to page 20

(d) I don't understand how to tell Turn to page 33

Your answer was 8/5 or 3/4. No! The correct answer was 5/8.

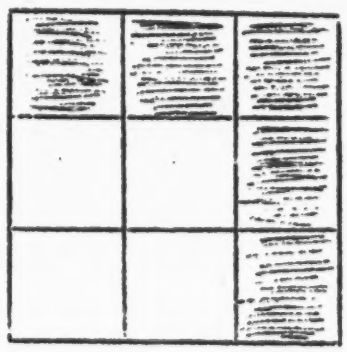


Let's look at it again. Remember that the denominator always tells how many equal parts there are in the total. In this problem there should be 8. Count them.

How many of the total parts are shaded? There are 5 parts shaded.

Then, we simply say that 5/8 of the entire circle is shaded.

Did that help you any? Here's another one.



What fraction of the square on the left is shaded?

(a) 5/9 Turn to page 27

(b) 4/9 Turn to page 33

(c) 1/2 Turn to page 17

(d) I just don't get it Turn to page 33

Your last answer of 13 was not correct. In 13/15, the 13 is on top. So, it must be the numerator.

What is the denominator of k/x?

(a) k Turn to page 40

(b) x Turn to page 44

You said that in the fraction 3/13, 13 is the numerator and 3 is the denominator. That is not correct.

Always remember:

Numerator - - - - - top

Denominator - - - - - bottom

Say that over in your mind several times before going on.

It's really not hard at all.

In any fraction the denominator is on the _____, while the numerator is on the _____.

(a) top - - - - - bottom Turn to page 40

(b) bottom - - - - - top Turn to page 45

In the fraction 3/4, 3 is the numerator.

In any fraction the top number is always called the numerator. The bottom number is always called the denominator.

So, in the fraction 3/4, 3 is the top and 4 is the bottom.

Therefore, 3 is the numerator. 4 would be the denominator.

As another example take the fraction 5/17. Here 5 is the numerator. 17 is the denominator.

In the fraction 3/13

(a) 3 is the numerator and 13 is the denominator
Turn to page 45

(b) 13 is the numerator and 3 is the denominator
Turn to page 38

You're making it too hard. But these words are very important. They must be learned.

Go ask your teacher to explain numerator and denominator.

Then, return to page 19.

No! The denominator of 7/15 is 15. Remember, the bottom is the denominator.

What is the numerator of x/3?

(a)	x	Turn to page 46
(b)	3	Turn to page 44
(c)	Don't know	Turn to page 42

The correct answer to the last problem was x. Remember that the numerator in any fraction is always on top. The denominator is on the bottom.

They do not always have to be a number. They can be letters which represent numbers.

What is the denominator of E/R?

(a)	R	Turn to page 43
(b)	E	Turn to page 40
(c)	Don't know	Turn to page 40

Good! R is the denominator.

Which (numerator or denominator) always goes on the top of a fraction?

(a) Numerator Turn to page 47

(b) Denominator Turn to page 40

The correct answer to the last problem was x. Remember that the numerator in any fraction is always on top. The denominator is on the bottom.

They do not always have to be a number. They can be letters which represent numbers.

What is the denominator of E/R?

(a)	R	Turn to page 43
(b)	E	Turn to page 40
(c)	Don't know	Turn to page 40

You're doing fine. Your last answer was correct. Here is one more.

What is the denominator of the fraction 7/15?

(a) 15 Turn to page 47

(b) 7 Turn to page 41

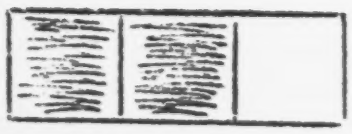
Good! x is the numerator of x/3. The numerators and denominators can be letters as well as numbers. The letters just represent numbers.

What is the denominator of 13/15?

(a) 13 Turn to page 37

(b) 15 Turn to page 47

Your last answer was correct. Very good! Be sure to continue using the terms numerator and denominator when talking about fractions. They are important words to remember.



The idea of a ratio is almost the same as the idea of a fraction. For example, consider the figure on the left. We can say that the ratio of the shaded area to the whole area is 2 to 3 or 2/3.

Another example would be that the ratio of the shaded area to the white area is 2 to 1 or 2/1.

In any ratio the first number always corresponds to the numerator of the fraction. The second number corresponds to the denominator.

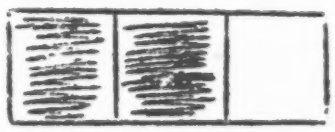
What fraction represents the ratio 3 to 7?

(a) 7/3 Turn to page 52

(b) 3/7 Turn to page 51

(c) Don't know Turn to page 54

Your last answer was correct. Very good! Be sure to continue using the terms numerator and denominator when talking about fractions. They are important words to remember.



The idea of a ratio is almost the same as the idea of a fraction. For example, consider the figure on the left. We can say that the ratio of the shaded area to the whole area is 2 to 3 or 2/3.

Another example would be that the ratio of the shaded area to the white area is 2 to 1 or 2/1.

In any ratio the first number always corresponds to the numerator of the fraction. The second number corresponds to the denominator.

What fraction represents the ratio 3 to 7?

(a)	7/3	Turn to page 52
(b)	3/7	Turn to page 51
(c)	Don't know	Turn to page 54

No! Both 9/2 and 9 to 2 are incorrect. In fact, these answers both mean the same thing. The correct answer was 2 to 9.

The fraction 2/9 expresses the ratio 2 to 9.

It's really quite simple. Just remember:

First number - - - - - numerator

Second number - - - - - denominator

Try another one and see if you can get it.

What fraction is the same as the ratio 7 to 8?

(a) 7/8 Turn to page 53

(b) 8/7 Turn to page 56

(c) Don't know Turn to page 62

Very good! You have now shown that you understand the ideas of this unit. Let's review what we've done.

I. A fraction is a quantity of the form a/b, where a and b are integers. b cannot be zero.

II. The top term in the fraction a/b is always called the numerator. The bottom term in the fraction a/b is always called the denominator.

III. The idea of ratio is the same as the idea of fraction. The ratio of any two numbers x and y can be expressed in the fractional form x/y.

Now that you understand ratio, we can use it to say that a fraction is the ratio of two integers a and b, where b is not zero.

Now, you should be ready for a quiz over this unit. If you need to review, refer to the following pages.

pp. 1 - 14	Recognition of fraction
pp. 15 - 36	Using shaded figures
pp. 37 - 48	Numerator and Denominator
pp. 49 - 64	Ratio

Go tell your teacher you have finished the unit.

Your answer was 3/7. You're doing very well.

Here's another one.

The fraction 2/9 expresses the ratio

(a) 2 to 9 Turn to page 50

(b) 9 to 2 Turn to page 49

(c) 9/2 Turn to page 49

Your answer to the last one was incorrect.

Let's try again. The fraction that represents the ratio 3 to 7 is 3/7.

The first number of the ratio is the numerator of the fraction. The second number is the denominator.

In our problem, for the ratio 3 to 7, the 3 is first and the 7 is second. Then, the fraction must be 3/7.

Remember that the ratio 5 to 9 is the same as the fraction 5/9.

What fraction is the same as the ratio 11 to 3?

(a) 1/13 Turn to page 55

(b) 11/3 Turn to page 63

(c) 3/11 Turn to page 55

Good! I think you might have it. Let's try one more just to be sure.

What fraction represents the ratio 33 to 17?

(a)	17/33	Turn to page 61
(b)	33/17	Turn to page 50
(c)	3/317	Turn to page 64
(d)	I don't know	Turn to page 61

The fraction that represents the ratio 3 to 7 is 3/7.

The first number of the ratio is the numerator of the fraction. The second number is the denominator.

In our problem, for the ratio 3 to 7, the 3 is first and the 7 is second. Then, the fraction must be 3/7.

Remember that the ratio 5 to 9 is the same as the fraction 5/9.

What fraction is the same as the ratio 11 to 3?

(a) 1/13 Turn to page 55

(b) 11/3 Turn to page 63

(c) 3/11 Turn to page 55

No! The correct answer to the last problem was 11/3. Let's see why this is true.

In the ratio 11 to 3, 11 is the first number. So, it must be the numerator of the fraction. 3 is the second number. So, it must be the denominator. That makes the fraction 11/3.

Always use the same numbers that are given. Read carefully. Do not switch the order.

Remember that ratio and fraction are really two terms expressing the same relationship. For example, the ratio 3 to 2 is the same as the fraction 3/2. The fraction 1/8 represents the ratio 1 to 8. Every fraction is really a ratio.

Here's another one for you to try.

The ratio 2 to 5 can be expressed by the fraction:

(a) 3/5 Turn to page 58

(b) 5/2 Turn to page 59

(c) 2/5 Turn to page 60

No! 7/8 is the fraction that represents the ratio 7 to 8.

The numerator 7 must be the same as the first number in the ratio. The denominator 8 must be the same as the second number in the ratio.

7 - - - - - first number - - - - - numerator

8 - - - - - second number - - - - - denominator

The ratio 3 to 2 is the same as the fraction

(a) 3/2 Turn to page 57

(b) 2/3 Turn to page 58

(c) I still don't get it
Turn to page 59

Excellent! 3/2 is correct.

Here's one more.

4/7 is the same as _____ to _____.

(a) 4, 7 Turn to page 50

(b) 7, 4 Turn to page 58

(c) I'm not sure Turn to page 59

No! You are having trouble understanding what a ratio is.

Go see your teacher for help in this area.

Then, return to page 47.

No! You are having trouble understanding what a ratio is.

Go see your teacher for help in this area.

Then, return to page 47.

Your answer was 2/5. Correct!

What fraction is the same as the ratio 7 to 8?

(a) 7/8 Turn to page 53

(b) 8/7 Turn to page 56

(c) Don't know Turn to page 62

Darn! You almost had it. Let's review the rule.

First number in ratio - - - - - numerator.

Second number in ratio - - - - - denominator.

The fraction 7/10 is the same as the ratio

(a) 70 to 10 Turn to page 58

(b) 7 to 10 Turn to page 50

(c) 10 to 7 Turn to page 59

You said you didn't know.

The numerator 7 must be the same as the first number in the ratio. The denominator 8 must be the same as the second number in the ratio.

7 - - - - - first number - - - - - numerator

8 - - - - - second number - - - - - denominator

The ratio 3 to 2 is the same as the fraction

(a) 3/2 Turn to page 57

(b) 2/3 Turn to page 58

(c) I still don't get it
Turn to page 59

Your answer was 11/3. You're starting to catch on.

Here's another one.

The fraction 2/9 expresses the ratio

(a) 2 to 9 Turn to page 50

(b) 9 to 2 Turn to page 49

(c) 9/2 Turn to page 49

Darn! You almost had it. Let's review the rule.

First number in ratio - - - - - numerator.

Second number in ratio - - - - - denominator.

The fraction 7/10 is the same as the ratio

(a) 70 to 10 Turn to page 58

(b) 7 to 10 Turn to page 50

(c) 10 to 7 Turn to page 59

TEST QUESTIONS

UNIT 4 - FRACTION AND RATIO

Directions: The correct answers will always be expressed in lowest terms.

1. Is k/13 a fraction?

   (a) Yes

   (b) No

2. 4/5 expresses the ratio

   (a) 5 to 4

   (b) 4:2:5

   (c) 4 to 5

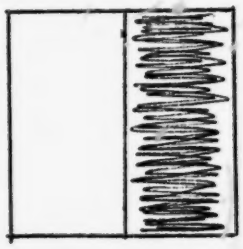
3. The numerator of 5/8 is

   (a) 5

   (b) 8

   (c) The line /.

4. What fraction of the square is shaded?



   (a) 1/3

   (b) 1/2

   (c) 1/4

   (d) 2/5

5. Which of the following is a fraction?

   (a) 3

   (b) 13

   (c) 2/85

   (d) 1.7

6. How would you express the ratio 7 to 10?

   (a) 7/10

   (b) 7:2:10

   (c) 7 . 10

   (d) 10/7

7. The bottom number in a fraction is called the _____.

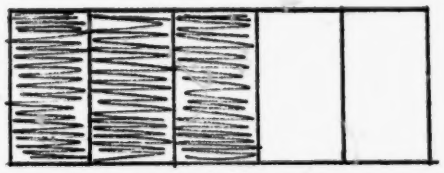
   (a) indicator

   (b) numerator

   (c) demonstrator

   (d) denominator

8. How much of the rectangle is shaded?



   (a) 3/2

   (b) 2/3

   (c) 2/5

   (d) 3/5

9. We have defined a fraction as a/b. If a = 15 and b = 9, what numerical fraction is a/b?

   (a) 9/15

   (b) 15/9

   (c) a/b

10. The fraction of 15/8 expresses the ratio of

   (a) 15 to 8

   (b) 8 to 15

   (c) 30 to 17

11. If the denominator of a fraction is x and the numerator is y, the the fraction is

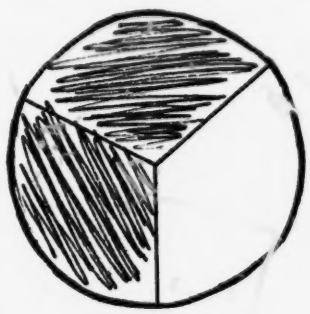
    (a) y/x

    (b) x/y

    (c) a/b

    (d) 1/2

12. The shaded area represents what fraction of the whole circle?



    (a) 1/3

    (b) 3/4

    (c) 2/3

    (d) 3/3

13. Which of the following are fractions?

    (1) 7/10, (2) 15, (3) 6.9, (4) x/y, (5) 2/5

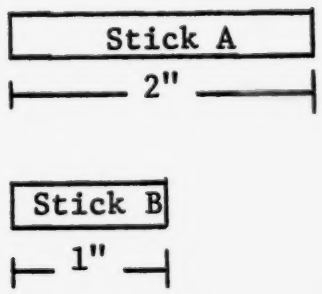
    (a) 2 and 5

    (b) 3

    (c) 2, 3, and 4

    (c) 1, 4, and 5

14. What is the ratio of the length of stick A to stick B?



    (a) 1/2

    (b) 1

    (c) 2/1

    (d) 2:2:1

15. In the fraction 11/17,

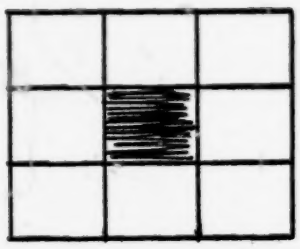
    (a) 17 is the numerator and 11 the denominator

    (b) 11 and 17 are both numerators

    (c) 11 is the numerator and 17 the denominator

    (d) 11 and 17 are both denominators

16. The shaded area is what fraction of the square?



    (a) 1/10

    (b) 2/17

    (c) 1/9

    (d) 9/1

17. Which of the following is not an acceptable fraction?

    (a) 2/9

    (b) 3/7

    (c) 3/2

    (d) 5/0

18. If you have 10 coins and 7 of them are pennies, what is the ratio of pennies to the total number of coins you have?

    (a) 7/10

    (b) 3/10

    (c) 3/7

    (d) 7/3

19. In the fraction 3k/13 the numerator is

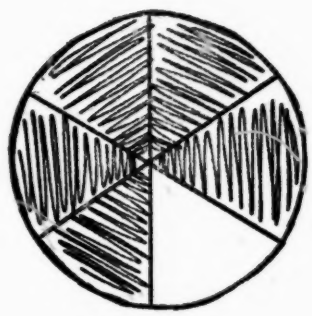
(a) 3

(b) 13

(c) 3k

(d) k

20. What fraction of the circle is <u>not</u> shaded?



(a) 1/7

(b) 1/6

(c) 1/8

(d) 5/6

Answer Sheet - Unit 4

1. a (Yes)
2. c (4 to 5)
3. a (5)
4. b (1/2)
5. c (2/85)
6. a (7/10)
7. d (denominator)
8. d (3/5)
9. b (15/9)
10. a (15 to 8)
11. a (y/x)
12. c (2/3)
13. d (7/10, x/y, 2/5)
14. c (2/1)
15. c (11-numerator & 17-denominator)
16. c (1/9)
17. d (5/0)
18. a (7/10)
19. c (3k)
20. b (1/6)

TO THE INSTRUCTOR: The above problems are related to the objectives of unit as follows:

Objective	Problems
1	1, 5, 9, 13, 17
2	2, 6, 10, 14, 18
3	3, 7, 11, 15, 19
4	4, 8, 12, 16, 20

OE 6000 (REV. 9-66)

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF EDUCATION

ERIC REPORT RESUME

(OP)

ERIC ACCESSION NO.	CLEARINGHOUSE ACCESSION NUMBER	RESUME DATE	P.A.	T.A.
		June 1968		

IS DOCUMENT COPYRIGHTED? YES ☐ NO ☒
ERIC REPRODUCTION RELEASE? YES ☒ NO ☐

001

100 TITLE

101
102 Occupational Mathematics - FRACTION AND RATIO
103

200 PERSONAL AUTHORS
Rahmlow, Harold; Ostheller, Karl; Potratz, Clarence; Winchell, L.; Snoey, Arthur

300 INSTITUTION SOURCE	SOURCE CODE
Washington State University, Pullman, Washington, Dept. of Education	
310 REPORT/SERIES NO. Final Report No. 16-D	
320 OTHER SOURCE	SOURCE CODE
330 OTHER REPORT NO.	
340 OTHER SOURCE	SOURCE CODE
350 OTHER REPORT NO.	
400 PUBL. DATE June 1968 --	CONTRACT GRANT NUMBER OEG-4-7-070031-1626

500 PAGINATION, ETC.
501 68 pages

600 RETRIEVAL TERMS
601 Occupational mathematics
602 Programmed instruction
603 Fractions and ratios
604
605
606

607 IDENTIFIERS
Vo-Tech. Education Research and Development Project (no. 7-0031)

800 ABSTRACT:

801 One book of a 21-book series of programmed instruction materials designed to
802 help pupils acquire mathematics capabilities most useful in sub-professional
803 level occupations. Other programmed books in the series are:
804
805 Symbols
806 Representing Numbers by Letters
807 Equivalent Forms
808 Addition of Fractions
809 Subtraction of Fractions
810 Multiplication of Fractions
811 Division of Fractions
812 Concepts of Decimals and Fractions
813 Addition and Subtraction of Decimals
814 Multiplication of Decimals
815 Division of Decimals
816 Conversion of Fractions into Decimals
817 Equivalent Forms of A = BC
818 Solutions of A = BC
819 Percentage
820 Commutative Law
821 Reciprocals
822 Scientific Notation
Proportions
Concepts of Number Bases